Premier

27xxA

Revision : B

PREMIER 27xxA SERIES OPERATING MANUAL

Sefelec

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WARRANTY:

SEFELEC warrants that units are free from defects in material and workmanship. SEFELEC warrants also that, when properly used, that units will perform in accordance with specifications of this manual.

If within one year after original delivery it is found not to meet this standard, it will be repaired at no charge in SEFELEC service facility in Lognes (France).

Changes in the unit not approved by SEFELEC will cancel this warranty.

SEFELEC will not be liable for any indirect damages resulting of the use of the unit.

This warranty is in lieu of all other warranties.

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Warning : This unit must be used by qualified people. Every precautions for the use of units connected to the main must be taken during its use. In particular, this unit must be connected to earth.

The specifications of this manual, the correct operation of the unit as well as the operator's security are guaranteed only when the supplied accessories are used. The measurement probes can include limitation or protective elements, therefore it is forbidden to modify without written agreement from SEFELEC company.
In case of use under other conditions than the one specified in this manual, the security of the user will be in danger.

MEANING OF THE DIFFERENT SYMBOLS ON THE INSTRUMENT

	Warning (See document attached)
	Warning, risk of electric chock.
	DC voltage.
	AC and DC voltages.
	AC voltage.
	Earth connection.

1 PRODUCT INTRODUCTION

1.1 Description

The PREMIER 2700A series of Electrical Safety Tester (EST) is designed for AD/DC Withstanding Voltage Test and Insulation Resistance Test(IR) for providing a safe and accurate test environment for the operator. With thoughtful design described in 1-2. Feature to insure a safe operation of high voltage test and protect user from hazardous impact.

The Electrical Safety Testers comply with the requirement of the electrical equipment & appliance control ordinances and EN, VDE, JIS, CSA, UL, BS and other standards as well. The testers can be used for withstanding voltage test of the various types of electrical and equipment and components.

The PREMIER 2700A series is based on the family of Sefelec withstanding voltage tester. It includes AC withstanding voltage test, DC withstanding voltage test, insulation resistance test and Ground Bond test (GB).

Function Model	AC	DC	IR	GB
Premier 2705A	X			
Premier 2715A	X	X		
Premier 2725A	X		X	
Premier 2735A	X	X	X	
Premier 2740A	X			X
Premier 2745A	X	X	X	X

1.2 Features

The PREMIER 2700A series offer several other features:

1) No load setup of trip current and output voltage.
A safe way to setup trip current and output voltage without high voltage activated.

2) A large 24×2 character LCD with adjustable LED backlight.
Provide a clear display about test parameters, which including group, step, mode, status, output voltage, trip current and test time.

3) Easily and quickly setup by front panel.
A user-friendly interface provides user with an easy and quick way to set all parameters.

4) Electronic ramping and testing
Digital controlled ramping time and testing time.

5) Line and load regulation
Linear amplifier and feedback-control maintain output voltage disregard of the variation of load.

6) Selectable output frequency
50/60 Hz is selectable by utility setup.

7) Adjustable ARC detect level
ARC detect level could be setup by utility setup.

8) 10 groups of storage and each group has 16 steps
Total 10 storage groups provided for testing of different products, and each group has 16 steps.

9) Adjustable output voltage during test
A special test mode in step 0, user could adjust the output voltage during testing

10)Flashing high voltage indicator
A flashing red LED indicates dangerous situation during high voltage output is activated.

11)PLC remote control
The 9-pin interface provides inputs (START, RESET) and outputs (TEST, PASS, FAIL).

12)Data lock function
Front panel could be locked or unlocked by utility setup.

13)Earth Check function
Check the continuity of earth ground in the power inlet before testing.

14)Interlock function
No High voltage on the output if the INTERLOCK terminals are not shortened together .

15) RS-232 and GPIB Interface
The RS-232 and GPIB interface enables remote control operation and signal processing via a PC. (Option)

16) R/P Output
The output terminal located on the rear panel. (Option)

2. SPECIFICATION (15°C~35°C , RH <75%)

1) AC Hi-Pot Specifications	
Voltage Range	0.100~5.000kV
Voltage Step	5V/step
Voltage Regulation	1% of reading + 5 counts
Voltage Accuracy	1% of reading + 10V (above 500V)
Current Sourcing *	30~40mA(above 500V, maximum test time: 180 sec) 0.10~29.99mA(above 500V, continuous test) 0.10~10mA(below 500V, continuous test)
Current Limit	0.10~40mA, 0.02mA/step
Current Accuracy	1% of reading + 5 counts
2) DC Hi-Pot Specifications (Premier 2715A, 2735A, 2745A only)	
Voltage Range	0.100~6.000kV (Pole + connected to the HT output)
Voltage Step	5V/step
Voltage Regulation	1% of reading + 5 counts
Voltage Accuracy	1% of reading + 10V (above 500V)
Max Current	0.10~10.00mA(above 500V, continuous test) 0.10~2mA(below 500V, continuous test)
Current Limit	0.10 ~ 10 mA, 0.02mA/Stepp
Current Accuracy	1% of reading + 5 counts
3) Insulation Resistance Specifications (Premier 2725A, 2735A, 2740A, 2745A only)	
DC Voltage	50V/100V/500V/1000V (Pole + connected to the HT output)
Output voltage accuracy	+/-(3.5% + 40 V) in relation to the set point
Resistance Range	1~9999MΩ
Resistance Accuracy	50V/100V: 1~50MΩ : 5% of reading 51~200MΩ : 10% of reading 201~1990MΩ : 20% of reading 500V/1000V: 1~500MΩ : 5% of reading 501~2000MΩ : 10% of reading 2001~9999MΩ : 20% of reading
4) Ground Bond Specifications (Premier 2740A, 2745A only)	
Test Voltage	Max. 8V(DC)
Current Range	3~42A
Current Resolution	0.02A
Output current Accuracy	+/-(1% + 500 mA) in relation to reading value
Current reading accuracy	+/-(1% + 200 mA) in relation to
Resistance Range	0~600mΩ
Resistance Resolution	0.1m
Resistance Accuracy	1% of reading +10 mΩ in relation to the true value
Test Method	Four Terminals Test Mode

* The main purpose provided by the series of instruments is for Puncture Testing. The specification is not for continuous test. The temperature of heat-sink is monitored. The test procedure will stop if the heat-sink is too hot.

* Stop the instrument for 10 minutes when continuously proceeding 30~40mA withstanding test for one hour.

5) Continuity Check Specifications (exepted 2740A and 2745A)	
Test Current	0.1A
Current Accuracy	10%
Detect Accuracy	0.1Ω @1Ω
6) ARC Detect	
Detect Current	40 level (1~40mA)
7) Storage	
Groups	10
Steps per Group	16
8) PLC Interface	
Type of terminal	9-pin D-sub connector
Output breakdown voltage	±350V
Continuous load current	±100mA
9) Interface	
RS-232	Option
GPIB	Option
10) General	
Power Source	AC100V, 120V, 220V, 230V±10% 50/60Hz
Accessories	× 1 mains cord x 1 15pins connector x1 Instruction manual
Dimension	446(L) × 330(W) × 149(H) (m/m)
Weigh	Approx. 14.9 kgs

- The instrument must be used inside, in horizontal position or on tripode.
- Temperature :
  - In storage : -10°C to +60°C.
  - In operation : 0°C to +45°C.
- Accuracy is rated after half an hour of warm up and for a relative humidity < 50%.
- Altitude : up to 2000 meters
- Max. humidity rate : 80% for a temperature of 31°C.

Over voltage category :

- CAT II.

Rate of pollution :

- Pollution 2 : Occasional conductive pollution only by condensation.

Safety class :

- Class I instrument : Earth protection by mains connection.

OPTIONNAL ACCESSORIES LIST FOR THE 2700A PREMIER SERIES

TE75	HV probe (l=2m)
TE76	HV cable without probe (l=5m)
TE77	HV pistol (l=2m)
TE77-5	HV pistol (l=5m)
TE78	Remote control pistol (l=2m)
TE78-5	Remote control pistol (l=5m)
CO221	Pistol return lead (l=2m)
CO221-5	Pistol return lead (l=5m)
CO215	Box with mains plug : Schuko
CO216	Box with mains plug : UK
CO217	Box with mains plug : Switzerland
CO218	Box with mains plug : Italia
CO219	Box with mains plug : USA
CO220	Box with mains plug : France
AO16	Remote control foot switch
AO17	Simple , 2 hands remote control
KRPremier	Rack 19" 3U kit
CO222	RED/GREEN lamp
PREMIER-01	RS232 (option)
PREMIER-02	IEEE488 (option)
PREMIER-03	Rear output (option)
CalPremier	Calibration AC/DC/IR/continuity kit

3. PRECAUTIONS BEFORE OPERATION

Warning : This unit must be used by qualified people. Every precautions for the use of units connected to the main must be taken during its use. In particular, this unit must be connected to earth.

The specifications of this manual, the correct operation of the unit as well as the operator's security are guaranteed only when the supplied accessories are used. The measurement probes (TE75 , TE76 , TE77, …) can include limitation or protective elements, therefore it is forbidden to modify without written agreement from SEFELEC company.
In case of use under other conditions than the one specified in this manual, the security of the user will be in danger.

3.1 Safety information

Please read and follow these important safety instructions:

- Read the safety information at the beginning of this manual before operating the Premier series

- Make the necessary electrical safety connection checks. In particular, select the correct line voltage and make sure that the correct fuse is installed. Incorrect voltage or fuse selection present both an electrical safety and a fire hazard**.** Ensure that the rear panel fan is operating and that the vent is not blocked.

- When connecting to an electrical supply mains supply, the mains cord provided with the equipment should be used, and connected only to a mains supply with a suitable earth connection. Under no circumstance should the equipment be operated with earth disconnected.

- Working place :the working place must be isolated and when the high voltage is proceeding, it should be alerted with a warning of dangerous for special caution.

- Checking the Line Voltage

  The instrument can be applied any kind of line voltage shown in the table below. Before connecting the power plug to an AC line outlet, make sure the voltage selector of the rear panel is set to the correct position corresponding to the line voltage. It might be damaged the instrument if connected to the wrong AC line voltage.

WARNING. To avoid electrical shock the power cord protective grounding conductor must be connected to ground.
WARNING. To avoid personal injury, disconnect the power cord before removing the fuse holder.

When line voltages are changed, replace the required fuses shown as below:

Line voltage	Range	Fuse	Line voltage	Range	Fuse
100V 120V	90-110V 108-132V	T 7.0A 250V	220V 230V	198-242V 207-250V	T 4.0A 250V

3.2 Unpacking the instrument

When you unpack the Premier series unit , check that the following items are present before starting to use the unit:

- 1 x Premier series unit
- 1 x Mains Cord
- 1 x 15 pins connector
- 1 x Operating manual

Please contact the Sefelec Customer Support Team immediately if any of these items are missing or damaged.

Operator's Precaution

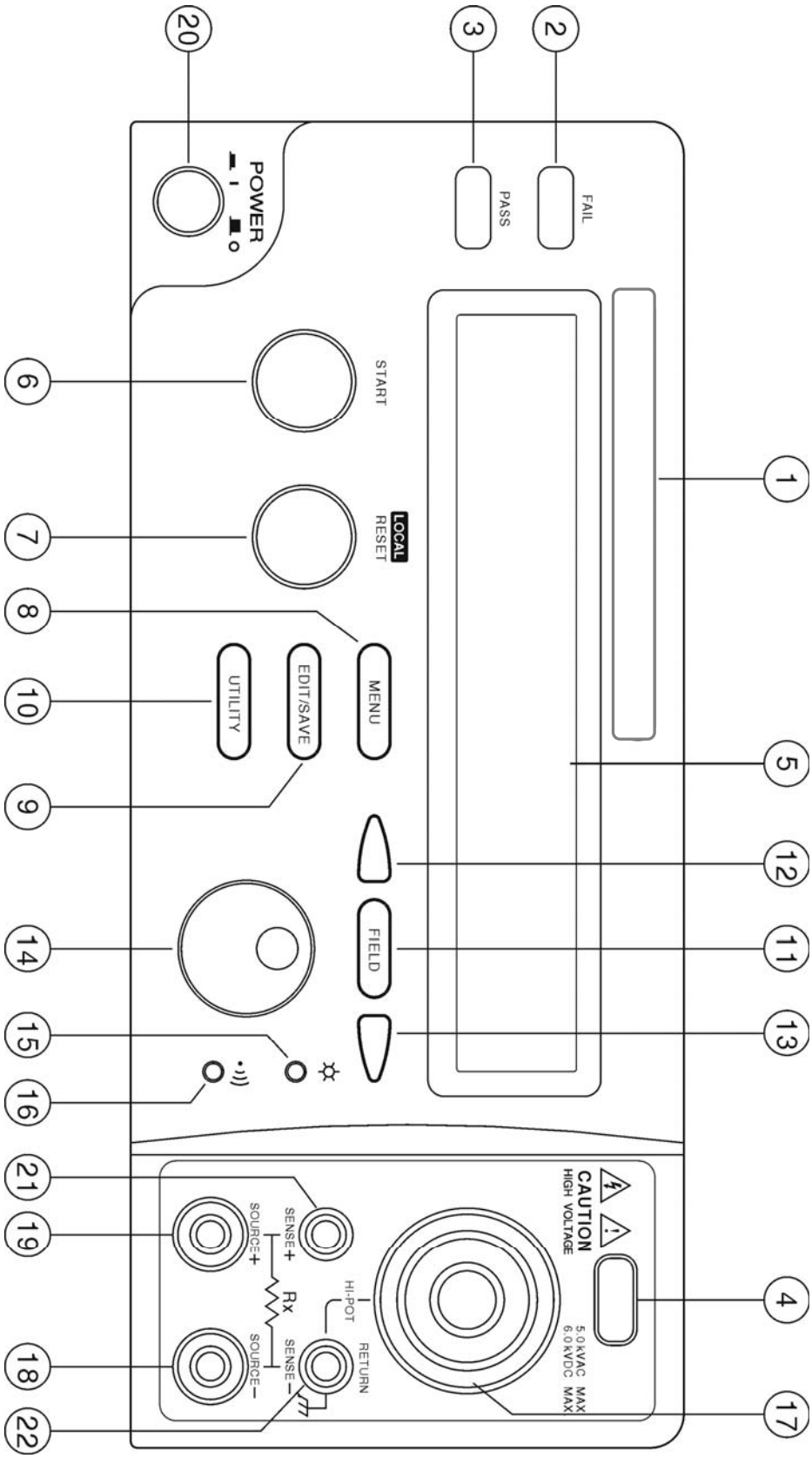
(1) With high output voltage and current of the Dielectric strength tester, only qualified person can operate the tester in order to avoid fatal electric shock.
(2) On-job training is required for operator to better use the tester smoothly and safely.
(3) The operator is prohibited to dress with metal ornaments or wear metal decoration in order to avoid electric shock.
(4) The person with cardiac or wear a pacemaker must not to operate the tester.

Secure Testing
Never operate the tester in the place with electric circuit device around.
The earth lead should be well connected in accordance with instruction. The Return Lead has to be connected to the tested object first before linking up test probe. Do not plug the high voltage test probe to the high voltage output terminal before doing the testing. Also, do not touch the electric conductor of test probe and the operator has to fully control the power on/off by using switch or remote control, which should not be lay aside carelessly.

WARNING: During the testing, do not touch the tested object or any other connected objects.

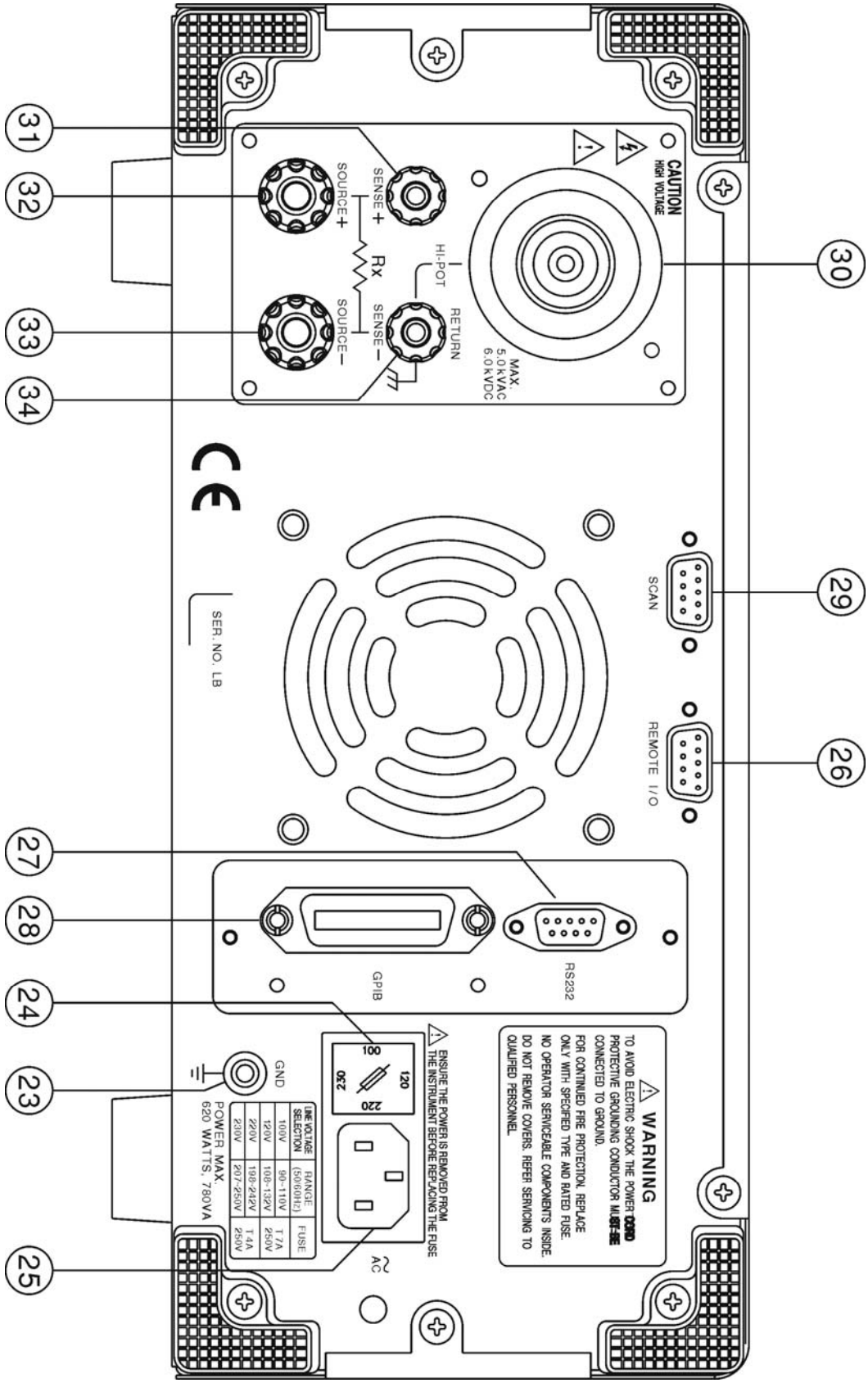
4. PANEL INTRODUCTION

- **Front panel :**



1	Model Number	Model number and description
2	FAIL Indicator LED	The red LED indicates failure of test procedure
3	PASS Indicator LED	The green LED indicates pass of test procedure
4	CAUTION Indicator LED	During test the red LED will flash to indicate dangerous.
5	Main Display LCD	The LCD displays all message about test procedure.
6	START Button	Press the green button to start a test procedure.
7	RESET Button	Press the red button to reset/stop a test procedure.
8	MENU Key	When you press the MENU key, the status becomes MENU and you can browse all groups.
9	EDIT/SAVE Key	When you press the EDIT/SAVE key, the status EDIT is active and you can edit this step or setup. Press the EDIT/SAVE key again will save this step or setup.
10	UTILITY Key	When you press the UTILITY key, the status UTILITY is active and you can view all the utility setups.
11	FIELD Key	When you edit the test step, press the FIELD key to change the active parameter of stop.
12	Left Arrow Key	Press the arrow key to adjust knob's resolution.
13	Right Arrow Key	Press the arrow key to adjust knob's resolution.
14	Knob	If status EDIT is active, turn the knob to increase or decrease the value of active parameter. If status MENU is active, turn the knob to increase or decrease active Step.
15	LCD Backlight Adjustment	Turn the VR to adjust the LED backlight of LCD.
16	Buzzer Volume Adjustment	Turn the VR to adjust the buzzer volume.
17	High Voltage Output Seat	High voltage output terminal.
18	SOURCE- Terminal (only for Ground Bond Test)	High current terminal for Ground Bond test.
19	SOURCE+ Terminal (only for Ground Bond Test)	High current terminal for Ground Bond test.
20	Power Switch	Press the power switch to turn on the tester.
21	SENSE+ Terminal	Voltage Terminal for Ground Bond test.
22	SENSE- & Return Terminal	SENSE- Terminal is a voltage terminal for Ground Bond test, and Return Terminal is for all test.

- **Rear panel :**


31
32
33
34
30
29
26
27
28
24
23
25
CAUTION
HIGH VOLTAGE
SENSE +
SOURCE +
Rx
HI-POT
RETURN
SOURCE –
SENSE –
MAX.
5.0KVAC
6.0KVDC
SCAN
REMOTE I/O
SER. NO. LB
GPIB
RS232
WARNING
TO AVOID ELECTRIC SHOCK THE POWER CORD PROTECTIVE GROUNDING CONDUCTOR MUST BE CONNECTED TO GROUND.
FOR CONTINUED FIRE PROTECTION, REPLACE ONLY WITH SPECIFIED TYPE AND RATED FUSE.
NO OPERATOR SERVICEABLE COMPONENTS INSIDE.
DO NOT REMOVE COVERS. REFER SERVICING TO QUALIFIED PERSONNEL.
ENSURE THE POWER IS REMOVED FROM THE INSTRUMENT BEFORE REPLACING THE FUSE
100
120
230
220
LINE VOLTAGE SELECTION
RANGE (50/60Hz)
FUSE
100V
90~110V
T 7A 250V
120V
108~132V
220V
198~242V
T 4A 250V
230V
207~250V
GND
POWER MAX.
620 WATTS, 780VA
AC

23	Ground Terminal	Connect Ground terminal to the earth ground.
24	Fuse Holder with Voltage Selector	To change AC source voltage, pull the fuse holder and rotate it to the proper value.
25	AC Inlet	Connect the AC power line to the inlet.
26	Remote Interface	The remote interface performs all the functions of PLC control.
27	RS232 Terminal (Option)	D-SUB 9 pin connector, Input/Output connector for RS232. (Option)
28	GPIB Terminal (Option)	Blue 24 connector, Input/Output connector for IEE-488.
29	Scanner Interface	D-sub 9 pins female connector for scanner box.
30	High Voltage Output on rear panel (Option)	High voltage output terminal.
31	Sense + Terminal on rear panel (Option)	Voltage terminal for Ground Bond test.
32	Source + Terminal on rear panel (Option)	High current terminal for Ground Bond test.
33	Source - Terminal on rear panel (Option)	High current terminal for Ground Bond test.
34	Sense - Terminal & Return Terminal on rear panel (Option)	Sense - terminal is a voltage terminal for Ground Bond test, Return terminal is for all tests.

5. OPERATION METHOD

5-1. Main Display LCD

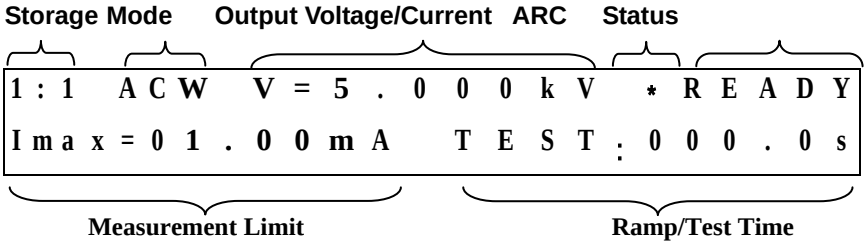
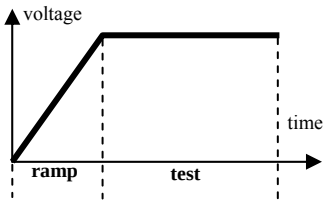


Table of parameters

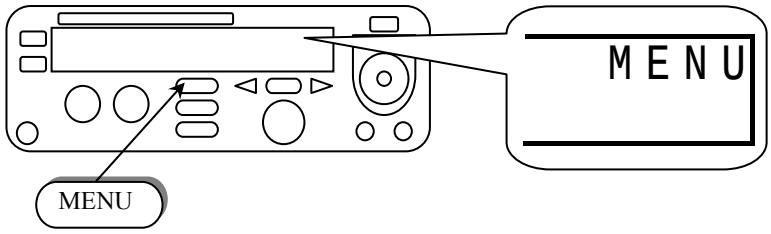
Storage	Group: Step There are total 10 groups, 16 steps for each group. The first number indicates group while the second number indicates step. Ex. 3:1 means 1st Step in the group 3 is active.
Mode	The test mode of tester includes: A C : AC Withstanding voltage test D C : DC Withstanding voltage test I R : Insulation Resistance test G B : Ground Bond test C n t : Continuity check The total types of mode will change for different model.

Output Voltage/Current	Output voltage or current for each step A C : Output voltage (0.100~ 5.000 kV) D C : Output voltage (0.100~ 6.000 kV) I R : Output voltage (500V or 1000V) G B : Output current (3.00~42.00A) C n t : Output current (0.100A) P A U : Pause between 2 test step
Status	The status of tester includes: M E N U : Browse and check steps of test. E D I T : Edit parameters S A V E : Save parameters U T I L : Browse and check system utility. READY: Ready for test T E S T : Testing P A S S : The result of test is pass F A I L : The result of test is fail S T O P : Stop the test
ARC	If the ARC function is enable, the sign " * " means that there is ARC during test.
Measurement Limit	Lower and upper limit of measurement Imax/Imin: Current measurement limit (AC & DC) Rmax/Rmin: Resistance measurement limit (IR & GB & Cnt)
Ramp/Test Time	Ramp time and test time A C : Ramp/Test (000.0~999.9 s) D C : Ramp/Test (000.0~999.9 s) I R : Test (000.0~999.9 s) G B : Test (000.0~999.9 s) C n t : Test (000.0~999.9 s) 

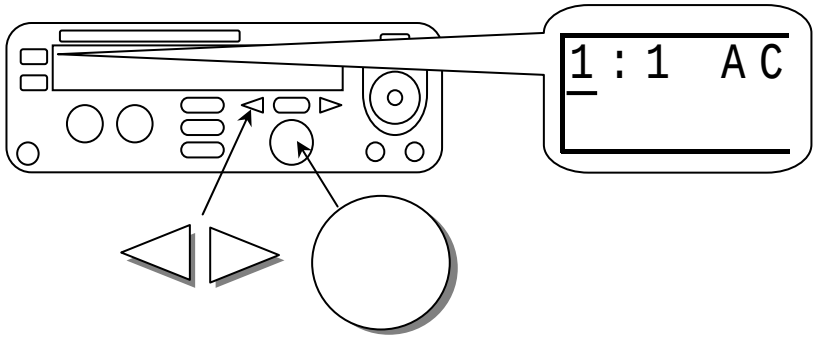
5-2. Prepare the PREMIER SERIES for Use

- **To view the Storage Steps**

1. Press the MENU key to enter status MENU.

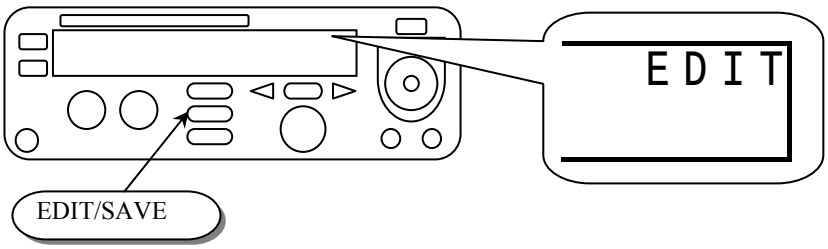


2. Use the left and right arrow keys to change knob's resolution (group or step). Use the knob to change the active step.

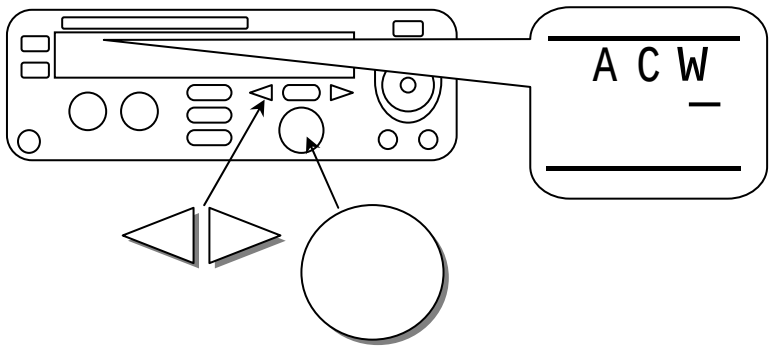


- **To Edit/Save the Storage Steps**

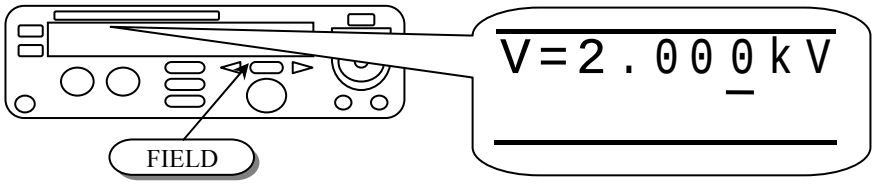
1. Follow the above procedure "**To View the Storage Steps** " to select a step.
2. Press the EDIT/SAVE key to enter status EDIT.



3. Use knob to adjust parameter. Use arrow keys to change knob's resolution.

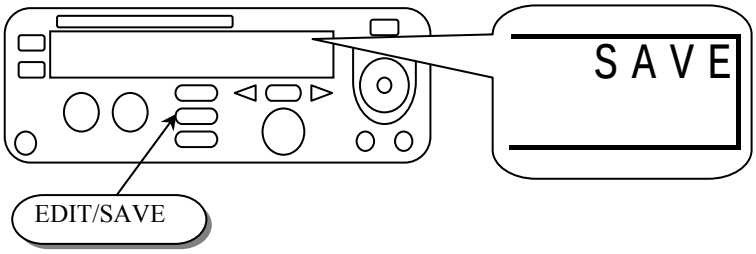


4. Use FIELD key to change active parameter.



5. Repeat step 3 and 4 to adjust parameter.

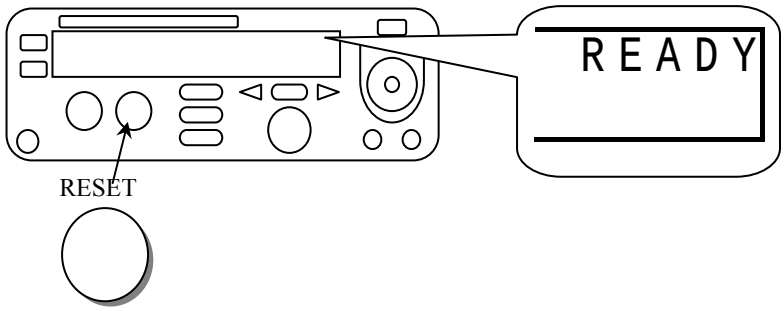
6. After setting all parameters press EDIT/SAVE key to save the step. The status will become SAVE. After the step is saved, the status will return to EDIT.



7. Repeat the procedure "**To View the Storage Steps**" to select another step.

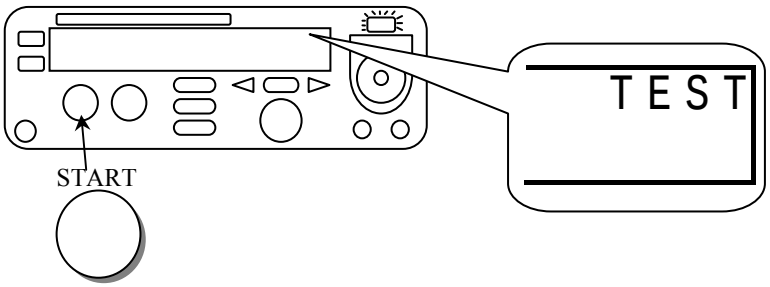
- **To Begin a Group Test**

1. Repeat the procedure "**To View the Storage Steps"** to select a step.
2. Press RESET button to enter status READY.

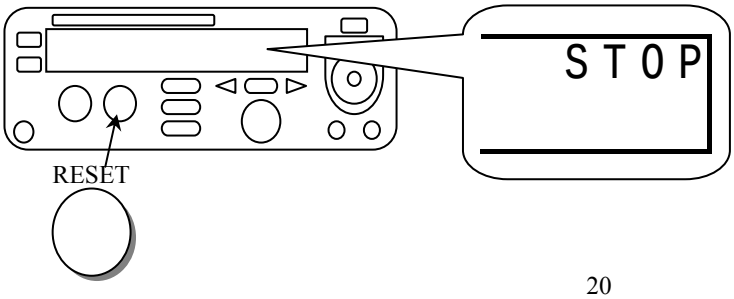


3. Make sure the test environment is safe to operate High Voltage. And check that the 15 pins connector is fitted on the rear panel with the pins 15 and 14 connected together.

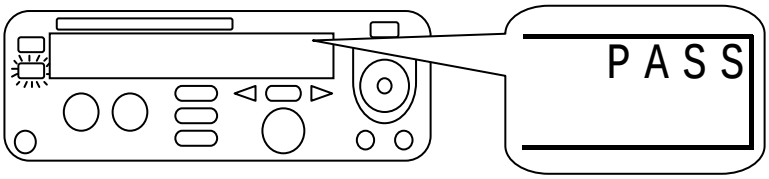
4. Press START button to start the test while the status TEST is active and the CAUTION LED flashes.



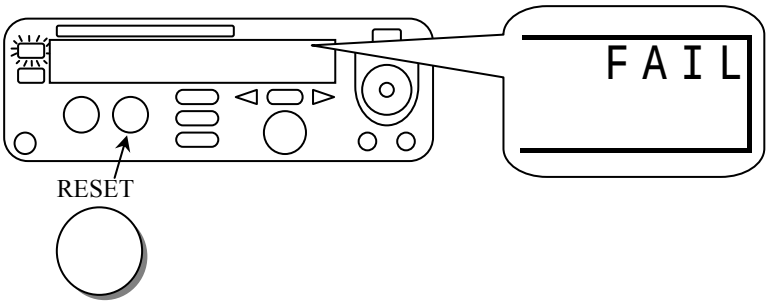
5.If you press RESET button the test will stop immediately.



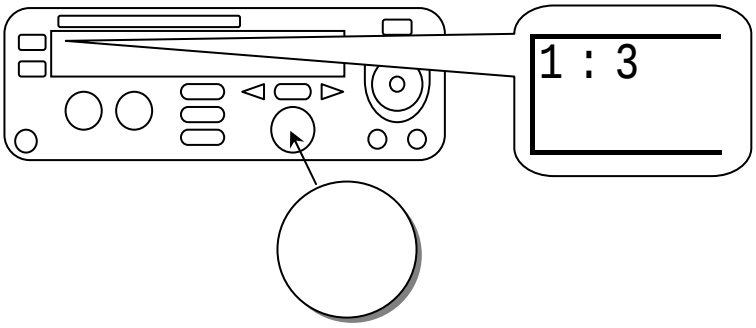
6.If the result is pass, the PASS LED will be active.



7.If the result is fail, the FAIL LED will be active and the buzzer will alarm operator. To stop the alarm, press RESET button again.



8. Use knob to view the result of group step by step.



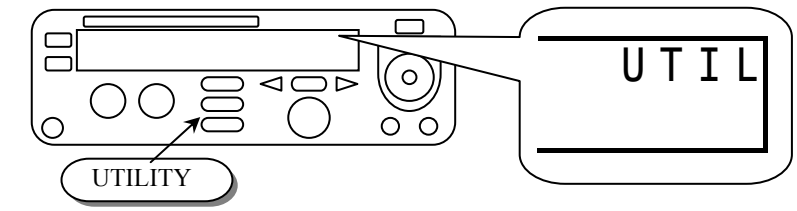
9. In the "COM" mode, if the INTERLOCK terminals are not shortened together , the **"SAFETY INTERLOCK OPEN "** message is displayed.

In the other mode, if the INTERLOCK terminals are not shortened together , the test result is fail.

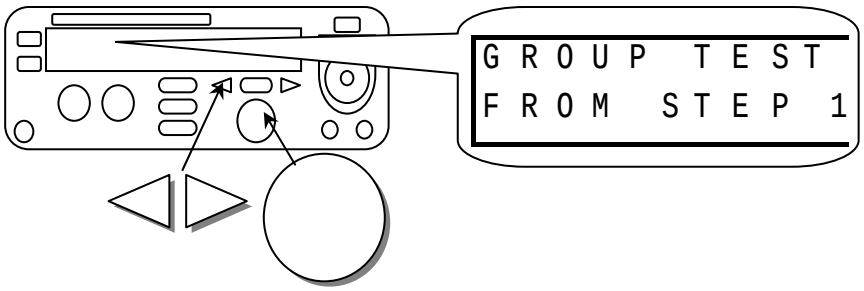
Check that the 15 pins connector is fitted on the rear panel with the pins 15 and 14 connected together.

- **To View the System Utility**

1. Press the UTILITY key to enter status UTIL.



2. Use the knob or arrow keys to change the active parameter.

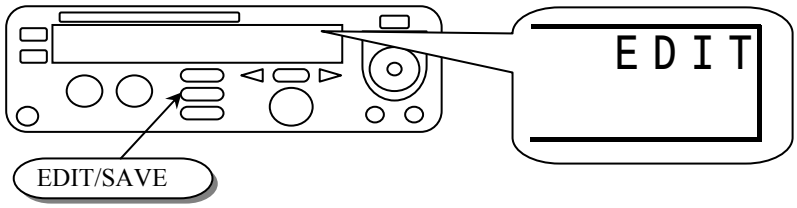


3. Table of system utility:

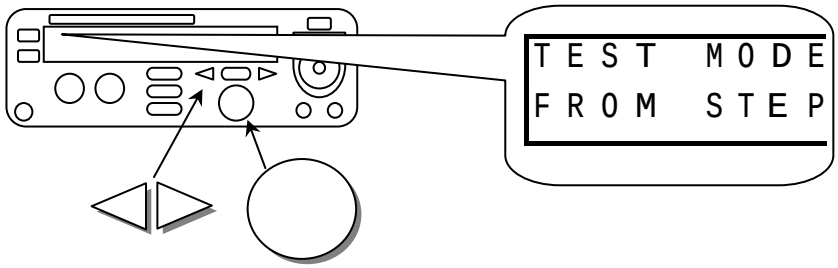
Parameter	Option	Description
TEST MODE	From STEP 1	The group test procedure always begins from step 1 to end of group. e.g. 3:1~3:6, 4:1~4:6
	From the present step	The group test procedure always begins from the step selected to end of group. e.g. 3:3~3:6, 4:3~4:6
ARC MODE	DISABLE	Disable the function arc detection.
	ENABLE & STOP	Enable the arc detection and stop the test when arc is active.
	ENABLE & CONTINUE	Enable the arc detection and continue the test when arc is active.
ARC CURRENT	From 2 mA up to 15 mA	Set the current level of arc detection.
AC FREQUENCY	50 Hz	Set the AC hi-pot output frequency to 50 Hz.
	60 Hz	Set the AC hi-pot output frequency to 60 Hz.
TEST CONTROL MODE	MODE 1	Control mode of front panel and remote I/O. Mode 1: Reset first (press reset button before test)
	MODE 2	Mode 2: Press start button directly.
	MODE 3	Mode 3: PLC enable(the start button is disable)
	MODE 4	Mode 4: Reserved.
DATA LOCK	UNLOCKED	Accept and save all parameters of test step and utility.
	LOCKED	Refuse to change any parameters of test step and utility.
Conti. Calibration		Calibrate the short resistance of test leads for test of Continuity check.
Language	ENGLISH FRANCAIS	Change the language for the message of the LCD screen
IR TEST MODE	Stop on fail	Stop on fail at the DUT detection.
	Stop on pass	Stop on pass at the DUT detection.
	Timer	Reach the time of determination for pass or fail.
ZERO CHECK (GB only)	Zero check by shorting the resistance of test leads only for ground bond test.	
Interface (Option)	RS-232 Baud Rate	1200, 2400, 4800, 9600.
	GPIB Address	00~31
FAIL Setting	Stop	The operation will stop upon the failure occurred at any step of group test.
	Continue	The operation will not stop until all 16 group steps has been tested.

- **To Edit/Save the System Utility**

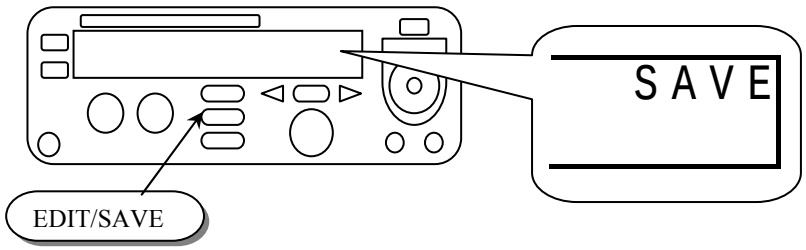
1. Follow the above procedure "To View the System Utility " to select a parameter.
2. Press the EDIT/SAVE key to enter status EDIT.



3. Use knob to adjust parameter. Use arrow keys to change knob's resolution.



4. After setting this parameter, press EDIT/SAVE key to save the parameter. The status will become SAVE. After the parameter is saved, the status will return to EDIT.



5. Repeat the procedure "**To View the System Utility"** to select another parameter.

5-3. Structure of storage steps

The storage steps of EST are total 10 groups (group 0 ~ group 9), 16 steps (step 1 ~ step 16) for each group. Except these steps, there is another

The storage steps of PREMIER SERIES are total 10 groups (group 0 ~ group 9), 16 steps (step 1 ~ step 16) for each group. Except these steps, there is another step "COM" for special test. The presentation of storage steps is Group: Step. The first number represents group while the second represents step.

		Group 0	Group 1	Group 2	Group 3	Group 4	…	Group 9
Step 1	COM	0:1	1:1	2:1	3:1	4:1		9:1
		↓	↓	↓	↓	↓		↓
Step 2		0:2	1:2	2:2	3:2	4:2		9:2
		↓	↓	↓	↓	↓		↓
Step 3		0:3	1:3	2:3	3:3	4:3		9:3
		↓	↓	↓	↓	↓		↓
Step 4		0:4	1:4	2:4	3:4	4:4		9:4
		↓	↓	↓	↓	↓		↓
Step 5		0:5	1:5	2:5	3:5	4:5		9:5
…		…	…	…	…	…		…
Step 16		0:16	1:16	2:16	3:16	4:16		9:16

The special test step "COM" contains another two types of test: MAC and MDC. The function of MAC (MDC) is as same as AC (DC), except user could adjust the output voltage during test.

After each step has been tested, the tested status will be shown on the screen:

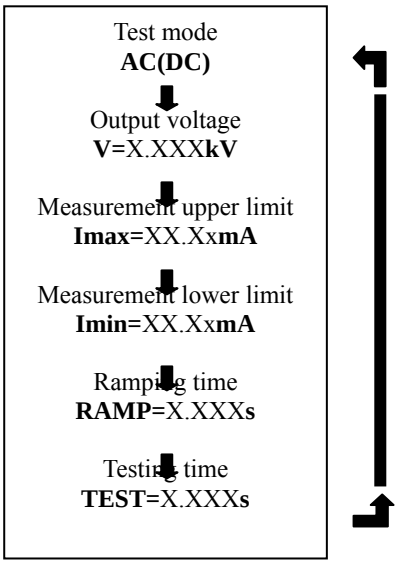
Step	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
Test	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

N: Empty
P: Pass
F: Fail (Bad test or security open)
Pas 1: CH1
Pas 2: CH2
Pas 3: CH3
Pas 4: CH4
Pas 5: CH5
Pas 6: CH6
Pas 7: CH7
Pas 8: CH8
Pas 9: CH9
Pas 0: CH10
Pas 1: CH11
Pas 2: CH12
Pas 3: CH13
Pas 4: CH15
Pas 5: CH15
Pas 6: CH16

5-4. Menu parameter setup

- **AC/DC withstanding voltage test (AC/DC)**

  Press MENU key to enter status MENU then use knob and arrow keys to select a step.
  Press EDIT/SAVE key to enter status EDIT. Now the cursor stays at the "test mode" field. Use the knob to select mode AC (DC).
  Functionality of FIELD key:



Press FIELD key to edit next field "output voltage". Use the knob to adjust the desired output voltage while use the arrow keys to adjust the knob's resolution (0.100~ 5.000 kV for AC, 0.100~ 6.000 kV for DC).
Press FIELD key again to enter next field "measurement upper limit". Use the knob to adjust the desired upper limit of leakage current while use the arrow keys to adjust the knob's resolution (0.10~20mA for AC, 0.10~7.5mA for DC).
Press FIELD key again to enter next field "measurement lower limit". Use the knob to adjust the desired lower limit of leakage current while use the arrow keys to adjust the knob's resolution (0.10~20mA for AC, 0.10~7.5mA for DC).
Press FIELD key again to enter next field "ramping time". Use the knob to adjust the desired ramping time while use the arrow keys to adjust the knob's resolution (0~999.9s).
Press FIELD key again to enter next field "testing time". Use the knob to adjust the desired testing time while use the arrow keys to adjust the knob's resolution (0~999.9s).
Press FIELD key again to return the first field "test mode" again.
Press EDIT/SAVE key to save all the parameters.

- **Continuous AC/DC withstanding voltage test (MAC/MDC)**

The MAC/MDC test is available only on step "0:0". Like the traditional hi-pot tester, you can use the knob and arrow keys to adjust output voltage during test.

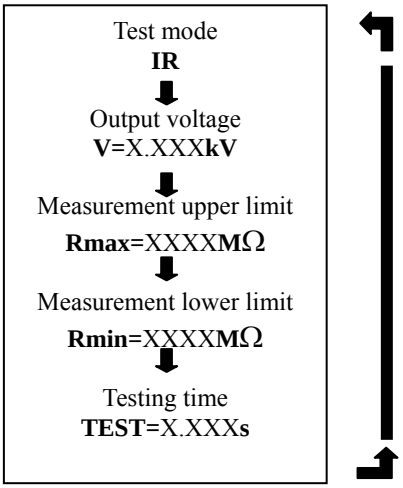
All the parameters of MAC/MDC are the same as AC/DC, except the testing time. The testing of MAC/MDC is not limited.

- **Insulation Resistance test (IR)**

Press MENU key to enter status MENU then use knob and arrow keys to select a step.

Press EDIT/SAVE key to enter status EDIT. Now the cursor stays at the "test mode" field. Use the knob to select mode IR.

Functionality of FIELD key:



Press FIELD key to edit next field "output voltage". Use the knob to adjust the desired output voltage (500V/1000V).

Press FIELD key again to enter next field "measurement upper limit". Use the knob to adjust the desired upper limit of resistance while use the arrow keys to adjust the knob's resolution (0~9999MΩ).

Press FIELD key again to enter next field "measurement lower limit". Use the knob to adjust the desired lower limit of resistance while use the arrow keys to adjust the knob's resolution (0~9999MΩ).

Press FIELD key again to enter next field "testing time". Use the knob to adjust the desired testing time while use the arrow keys to adjust the knob's resolution (0~999.9s).

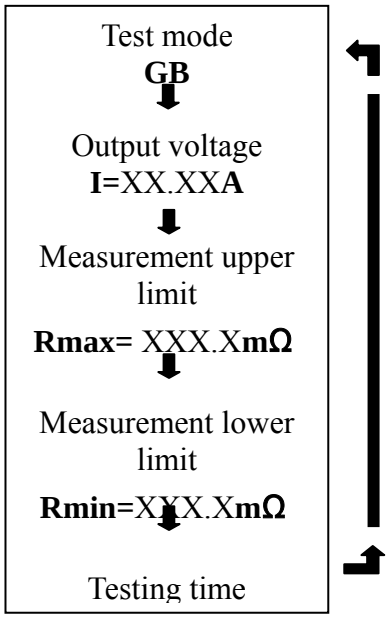
Press FIELD key again to return the first field "test mode" again.

Press EDIT/SAVE key to save all the parameters.

- **Ground Bonding Test**

  Press MENU key to enter status MENU then use knob and arrow keys to select a step.
  Press EDIT/SAVE key to enter status EDIT. Now the cursor stays at the "test mode" field. Use the knob to select mode GB.

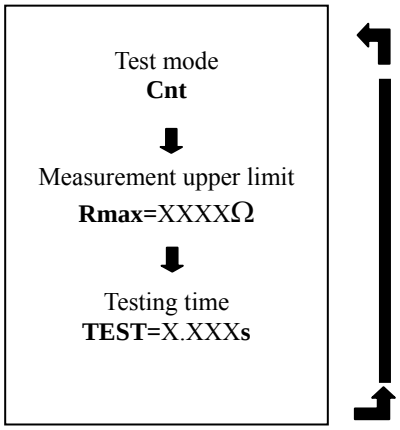
Functionality of FIELD key:



Press FIELD key to edit next field "output current". Use the knob to adjust the desired output current (3.00~42.00A).
Press FIELD key again to enter next field "measurement upper limit". Use the knob to adjust the desired upper limit of resistance while use the arrow keys to adjust the knob's resolution (0~620.0mΩ).
Press FIELD key again to enter next field "measurement lower limit". Use the knob to adjust the desired lower limit of resistance while use the arrow keys to adjust the knob's resolution (0~620.0mΩ).
Press FIELD key again to enter next field "testing time". Use the knob to adjust the desired testing time while use the arrow keys to adjust the knob's resolution (0~999.9s).
Press FIELD key again to return the first field "test mode" again.
Press EDIT/SAVE key to save all the parameters.

- **Continuity Check (Cnt)**

  Press MENU key to enter status MENU then use knob and arrow keys to select a step.
  Press EDIT/SAVE key to enter status EDIT. Now the cursor stays at the "test mode" field. Use the knob to select mode Cnt. The output current is fixed to 0.100A.
  Functionality of FIELD key:



  Press FIELD key to enter next field "measurement upper limit". Use the knob to adjust the desired upper limit of resistance while use the arrow keys to adjust the knob's resolution (0~1.200Ω).

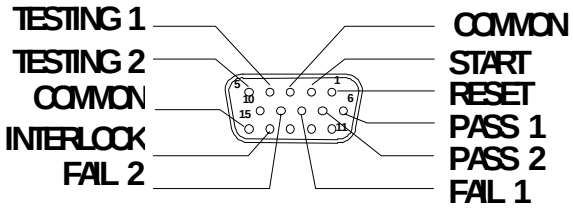
  Press FIELD key again to enter next field "testing time". Use the knob to adjust the desired testing time while use the arrow keys to adjust the knob's resolution (0~999.9s).
  Press FIELD key again to return the first field "test mode" again.
  Press EDIT/SAVE key to save all the parameters.

- **PAUSE mode (PAU)**

  Press MENU key to enter status MENU then use knob and arrow keys to select a step.
  Press EDIT/SAVE key to enter status EDIT. Now the cursor stays at the "test mode" field.
  Use the knob to select mode PAU.
  Press EDIT/SAVE key to save all the parameters.
  During a Group test with the Pause mode , an audible signal and the following message :'PRESS ON START' will displayed . Then press on START to continue the group test .

6. Functionality of remote interface

The remote interface provides three inputs (START, RESET and INTERLOCK) and three outputs (TESTING, PASS and FAIL).



RESET: Connect "RESET"(pin 1) to "COMMON"(pin 3) will reset or interrupt this machine (as same as the functionality of RESET button at front panel).

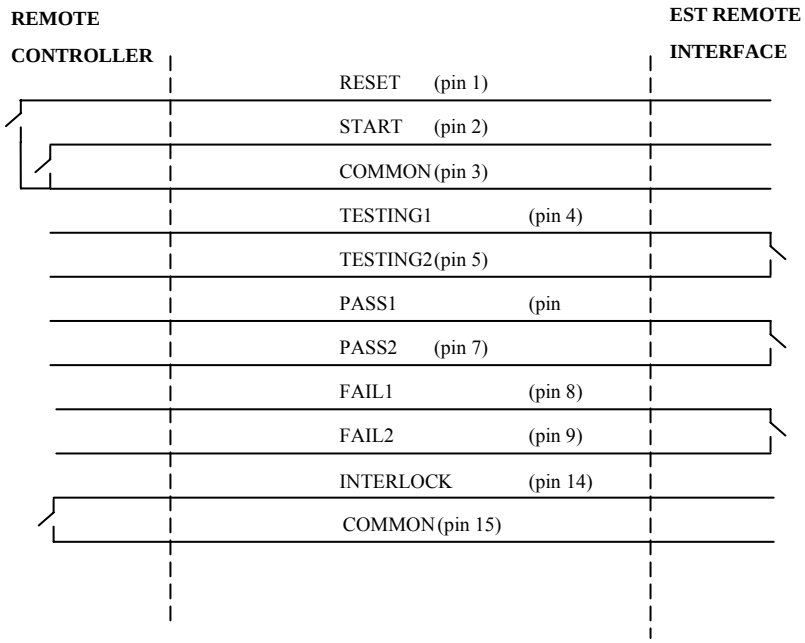
START: In status READY, connect "START"(pin 2) to "COMMON"(pin 3) will start the test procedure (as same as the functionality of START button at front panel).

TESTING1, TESTING 2: During test, the "TESTING1"(pin 4) and TESTING2"(pin 5) will be shorted.

PASS1, PASS2: If the result of test is "pass", the "PASS1"(pin 6) and "PASS2"(pin 7) will be shorted.

FAIL1, FAIL2: If the result of test is "fail", the "FAIL1"(pin 8) and "FAIL2"(pin 9) will be shorted.

INTERLOCK: The "INTERLOCK"(pin 14) must be connected to the "COMMON"(pin 15) during test.



7. MAINTENANCE

The following instructions are used by qualified person only to avoid electrical shock, do not perform any service other than contained in the operation instructions unless you are qualified to do so.

7.1 PRELIMINARY

Our warranty (refer to the beginning of this manual) attests the quality of materials and workmanship in our products. If malfunction should be suspected or other information be desired call our technical assistance:
+ 33 1.64.11.83.40 for FRANCE or contact your local distributor.

7.2 INSTRUMENT RETURN

Before returning an instrument to our Service Department, please call them at the above phone number for shipment instructions. Use packaging that is adequate to protect it from damage.

7.3 MAINTENANCE

Our units don't need particular maintenance except an annual calibration. If problems, please follow the brief check list here after. If the problem continues, call our service department at the above number.

- **LCD SCREEN DOESN'T COME UP**:
  - Check the correct connection of the main cord SE1
  - Check that the main voltage is in accordance with the value displayed on the main inlet on the rear panel of the unit
  - Check the fuse in the main inlet on the rear panel

If the fuse blows, the product will not operate. Try to determine and correct the cause of the blown fuse, then replace the fuse with correct rating and type shown as below:

Line voltage	Range	Fuse	Line voltage	Range	Fuse
100V 120V	90-110V 108-132V	T 7.0A 250V	220V 230V	198-242V 207-250V	T 4.0A 250V

WARNING: For continued fire protection, replace only with 250V fuse of the specified type and rating, and disconnect the power cord before proceeding fuse replacement.

The other possibilities for a bad functioning need an intervention inside the unit by qualified people. However we can supply a service manual including schematics of our units. Please get in contact with our Service department in order to know price and delivery time.

7.4 CLEANING

Only clean the instrument with a mild rag or slightly soaked with water.

7.5 CALIBRATION

We recommend to calibrate our units each year. The calibration must be performed by qualified people having the complete procedure as well as correctly checked standards. Our Maintenance department is at your service to perform the annual calibration. Nevertheless, if you wish to perform yourself the calibration, we can provide a calibration kit including a manual and a calibration box .
Please get in contact with our Service department in order to know the price and the delivery time.